

PROJECT NARRATIVE

a. Summary Information Page

- i. **Project Title:** Portola PM2.5 Nonattainment Area Air Shed Project
(EPA 2020 Targeted Air Shed Grant)
- ii. **Applicant Information:**
California Air Resources Board
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Application submitted on behalf of:
Northern Sierra Air Quality Management District
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- iii. **Total Project Cost**
 - a. Total cost of the project: \$2,882,468
 - b. Amount of funding requested from EPA: \$2,842,468
 - c. Funding from other sources, including any voluntary leveraged cost-share or in-kind resources: \$40,000
- iv. **Project Period:** January 1, 2021 through December 31, 2025
- v. **Project Description:** This project will extend a Wood Stove Change-out Program (currently funded by a 2015 Targeted Air Shed Grant) and add additional program elements to address needed resources for public outreach and education, enforcement and wood fuel quality.
- vi. **Place of Performance:** Plumas County, CA PM2.5 Nonattainment Area
- vii. **DUNS Number:** 195930276

b. Project Summary and Approach

i. Detailed project summary, description of specific actions and methods to be undertaken and the responsible institutions.

In March 2015, the U.S. Environmental Protection Agency (EPA) designated the City of Portola and surrounding parts of Plumas County, California, as a "[nonattainment area](#)" for the annual PM2.5 standard. PM2.5 from residential wood combustion is responsible for 80 percent of the PM2.5 mass annually and 90 percent on an average exceedance day. The objective of the project is to reduce pollution levels so that the Portola area can attain the PM2.5 standard by the end of 2021 and maintain the standard for the years to come.

The nonattainment area is a mountainous region within the Plumas National Forest of

Northern California. The City of Portola is located at an elevation of 4900 feet. It is in a small, mountain basin with predominantly westerly/southwesterly winds during the day and downslope winds during the night. Winters are cold with an average daily low of 21.8 degrees during October through March. The topography and climate contribute to stagnant conditions through the winter, keeping smoke from wood burning in the breathing zone, particularly through the evening, night and early morning. Reducing PM2.5 from wood burning is the only means to improve air quality and reach attainment.

On March 24, 2016, EPA awarded a 2015 Targeted Air Shed Grant to the California Air Resources Board (ARB), implemented by the District, to improve air quality by reducing emissions through a Wood Stove Change-out Program. The program is currently in place and will continue through 2020. A total of 600 old stoves/fireplaces are targeted for replacement by the end of 2020. At the time of this proposal submittal, approximately 400 stoves have been changed out. The District and ARB are currently waiting on approval of the EPA 2018 Targeted Air Shed Grant work plan, which includes 300 additional change-outs.

In order to achieve emission reduction goals, it is necessary to continue to implement a Wood Stove Change-out Program past 2020 and add further program elements. While there is some improvement in air quality, more emission reductions are needed. New EPA certified stoves should have a significantly lower emissions; however, operator usage of these stoves produces variable results. Experience with the current program has led to a few observations:

- There is a learning curve to using the new devices. Many program participants report that it takes time to adjust burning practices in new, EPA certified wood stoves that function quite differently than previous, uncertified wood stoves. A follow up visit by District staff, stove installers and/or chimney sweep providers is especially helpful in educating the participants. All participants are trained in using the new stove at the time of installation. But if the installation is completed in the summer months, they likely do not recall all the information provided by the time the stove is used in the winter.
- Restricting wood stove and pellet replacement devices to under 2 grams/per hour of emissions is likely to gain additional emission reductions on top of the reductions achieved by replacing higher emitting older stoves and fireplaces.
- Step 2 stoves operate poorly with high moisture fuel. Additional education and outreach is required to ensure only seasoned fuel (< 20% moisture content) is used. With this grant, a seasoned wood program will be developed.
- Those least resistant to changing out stoves have now participated in the program. Soliciting applications has become more time consuming. Knocking on doors, targeted mailings and follow up calls are becoming more important to reach those that either have not heard about the program or have been hesitant to participate. More staff resources are needed to focus efforts on identifying potential applicants and follow applicants through the process until a new heating device is installed. A Citizen Advisory Committee will be formed to inform and educate residents through peers and neighbors.
- An extension of the Wood Stove Change-out Program is crucial with a mandatory wood burning curtailment program commencing in the winter of 2020/2021. At that point, Portola residents who were unaware of the program or hesitant to participate, will be motivated to upgrade to an EPA certified stove. When there is a mandatory curtailment, residents will be able to burn only in EPA certified wood stoves for heating needs.
- The District also sees value in adding electric heat pump systems to the option for cleaner burning technology upgrades. Operator usage contributes greatly to the success or failure of achieving emission reductions from wood-to-wood

replacement. Installing a greater percentage of propane, kerosene and electric heating options is a more certain way to achieve emission reductions as operator usage is taken out of the equation.

This Portola PM2.5 Nonattainment Area Air Shed Project will include twelve elements.

Program Element 1: Wood Stove Change-out Program

The District received an EPA 2015 Targeted Air Shed Grant that included funding to change out 600 wood stoves through a Wood Stove Change-out Program. Another 300 change-outs are currently funded through the EPA 2018 Targeted Air Shed Grant. The District estimates another 100 wood stoves/fireplaces will need to be replaced with cleaner and more energy efficient home heating alternatives. An enforceable mandatory wintertime curtailment program will begin January 1, 2021 and it is expected that homeowners, who were previously unmotivated to change out an old, uncertified stove, may come forward. Wood Stove Change-out Program funding includes equipment, permitting and installation. Also included in equipment costs are emergency backup power generators, smoke/carbon monoxide detectors, stove thermometers, moisture meters, firestarter and destruction of uncertified stoves.

To qualify for a Wood Stove Change-out, the currently installed and operating wood burning device must be one of the following:

- A non-EPA certified wood stove (typically manufactured/installed prior to 1992); OR
- An EPA certified wood stove manufactured 20+ years ago with the emission control technology in disrepair*; OR
- An EPA certified wood stove manufactured 20+ years ago, in any condition, to be replaced with a pellet, electric heat pump, propane, or kerosene heating device; OR
- An open fireplace being used as a primary heating device.

**An EPA certified wood stove that is 20+ years old may be repaired when the emission control technology is not functioning properly. If not repairable at a reasonable rate, it will be replaced with a new EPA certified device.*

Qualified residents may choose a replacement device from the following options:

- EPA certified wood stoves and pellet stoves with emissions not exceeding 2 grams/hour and better than 70% efficiency.
- Propane or kerosene stoves
- Electric heat pump system (known as ductless, mini-split heat pumps), ENERGY STAR® compliant

The District will prioritize the installation of electric heat pumps. These heating systems can be used to provide electric heating at homes without heating ducts. The District will make sure to fund a replacement using only an ENERGY STAR® compliant devices and hire an installer familiar with the product and its installation. Since ductless heat pumps can operate using 25% to 50% less energy than electric resistance and forced air systems, consumers can expect a much lower energy bill. The estimated cost of an electric heat pump system is expected to be approximately \$10,000 per installation.

Residents have expressed a disinterest in either the heat pump or pellet stove primarily due to not being able to use these heat sources during power outages. In order to further incentivize the purchase of electric heat pump systems and pellet stoves, the District intends to pay for emergency power backup generators when necessary. The estimated cost is \$600 per generator, for emergency backup power for pellet stoves (cost is unknown for electric heat pumps). A backup generator will only be supplied if there is no other emergency backup source in the home.

Pellet stove installations currently make up 11% of all new installations in the 2015 Targeted Air Shed Grant program. The District expects that rate to continue with the 2020 Targeted Air Shed Grant, if awarded. For cost estimate purposes, the District plans 7% of

all installations to be electric heat pump systems (7 installations).

Incentives will range from \$1,500-\$5,000 per installation (up to \$10,700 for electric heat pump systems). Incentives will vary based on the replacement device type and whether the resident is in Zone 1 (Portola Sphere of Influence; higher priority area) or in Zone 2 (the entire non-attainment outside of Portola Sphere of Influence). Cost per installation is based on Step 2 stoves (less than or equal to 2 grams/hour emissions) that perform at 70% efficiency or better.

It is imperative to ensure that old, uncertified stoves are rendered inoperable. Destruction of stoves is currently handled by the City of Portola Public Works under an MOU between the City and the District (2015 Targeted Air Shed Grant). This MOU would be extended an additional 5 years to destroy 100 old stoves. To fund this program element, \$445,893 will be needed to cover all equipment installation costs, emergency backup power generators, smoke and carbon monoxide detectors (if necessary), stove thermometers (if necessary), moisture meters, firestarter and destruction of uncertified wood stoves.

Program Element 2: Burnwise Coordinator (1.0 FTE)

Emissions from wood stoves depends considerably on user behavior. Users can strongly influence emissions by adjusting burning conditions and fuel quality. Step 2 stoves work poorly when fuel moisture content is too high. Burning wet wood in a new stove may prevent achieving emissions of 2 gram/hour or less. Adequate burning conditions, especially with regard to air flow and underload, can significantly reduce PM emissions. One of the most common mistakes, especially for long-term users of uncertified stoves who recently switched to certified stoves, is firing at part load (underloading). This can increase emissions two-fold.¹ Unnecessary use of excess air also leads to a two- to three-fold increase in PM emissions due to reduced residence time within combustion region.² The District needs to expand its educational component by continuing the functions of the Burnwise Coordinator (past the 2018 Targeted Air Shed Grant), who will be in charge of the following:

- 1) Conduct follow-up visits - Each house participating in the Wood Stove Change-out Program will be visited once, after one winter of using the new device, to be surveyed about usage. Homes where problems are discovered (visible smoke, wet wood, etc.) will be visited subsequently until issues are resolved. In the case that a new stove is installed March-August, every effort will be made to provide a 'refresher' training during September-November before the stove is used;
- 2) Neighborhood outreach within the City of Portola to promote the Wood Stove Change-out Program;
- 3) Plan and participate in community events to provide information on the importance of proper burning techniques and using seasoned wood, as well as promoting the Wood Stove Change-out Program to solicit applications;
- 4) Distribute vouchers for a one-time Chimney Sweep visit after a year of using the new heating device.
- 5) Develop and implement a Wood Shed Program.
- 6) Develop and implement a Seasoned Wood Program.
- 7) Maintaining a database of owners/addresses with EPA certified heating devices.
- 8) Other duties to further the goals of improving air quality in the Greater Portola Area.

The Burnwise Coordinator position requires a full-time employee. The hourly rate is expected to be approximately \$25/hour. At 40 hours per week, over 3 years, this program

¹ Kindbom, K., Mawdsley, I., Nielsen, O. -K., Saarinen, K., Jónsson, K., & Aasestad, K. (2018). Emission factors for SLCP emissions from residential wood combustion in the Nordic countries: Improved emission inventories of Short Lived Climate Pollutants (SLCP). Copenhagen. <https://doi.org/10.6027/TN2017-570>

² Fachinger, F., Drewnick, F., Giere, R., Borrmann, S., How the user can influence particulate emissions from residential wood and pellet stoves: Emission factors for different fuels and burning conditions, Atmospheric Environment 158 (2017)216-226.

element is expected to require \$150,000 in funding.

Program Element 3: Wood Shed Program

The Burnwise Coordinator will continue the current wood shed program to provide dry storage to individual residents that do not have the resources to keep wood seasoned and dry. According to the U.S. EPA BurnWise program, wood moisture should be less than 20%. Greater moisture content leads to excessive smoke. The District will contract with local construction companies to build and distribute wood sheds in the nonattainment area. These woodsheds will be modeled after EPA's Burn Wise wood shed design (<https://www.epa.gov/burnwise>). According to the EPA site, the cost of materials per shed is estimated \$270, depending on locality. Due to the snow load in the winter, metal roofing should be added to the design. Construction and delivery will cost up to \$600 per shed.

The Burnwise Coordinator will determine need during follow up visits. If the resident does not have adequate storage to keep firewood dry, the Burnwise Coordinator will engage a contractor to build and deliver the shed. The District estimates that approximately 100 woodsheds would be needed. The cost for 100 wood sheds is estimated to be \$60,000.

Program Element 4: Seasoned Wood Program

The Burnwise Coordinator will research, develop and implement a Seasoned Wood Program. Using EPA-certified woodstoves does not guarantee emission reductions because emissions depend on the quality of firewood. Certified stoves are highly sensitive to wet wood due to limited capacity of the air systems³. Burning wet wood in a certified stove can increase PM2.5 emissions fivefold. Households must use properly dried firewood in order to achieve optimal emission reductions.

The Portola PM2.5 Nonattainment Area experiences significant fluctuation in quantity and quality of firewood available for purchase. To a large extent, seasonal workers, who try to take advantage of other employment in order to maximize their income, supply firewood in Plumas County. For example, in 2018, due to a strong economy, residents have found it difficult to procure wood fuel because seasonal firewood providers have found other employment.

In order to minimize fluctuation in wood availability and ensure that residents have access to properly seasoned, locally-sourced wood at a reasonable price, a voucher program will be researched and implement, if determined feasible. This program would certify wood providers that can show proof of less than 20% moisture content. Vouchers would only be redeemed with providers certified by the District.

In addition, a fuel processing and storage facility will be researched. It will likely develop as a partnership between the District, City of Portola, local churches, U.S. Forest Service, the Sierra Institute and/or local agencies such as the Portola Family Resource Center. Using grant money, the District may purchase commercial firewood processing equipment (and maintain it), secure a processing and storage location and build the necessary platform and shelter to keep wood seasoned and dry. Staffing and security may also need to be considered. The estimated cost for the developing, implementing and running a Seasoned Wood Program for 5 years is difficult to determine without further research. At a minimum, it is expected that \$300,000 of the grant money would be allocated to this program element.

³ Kindbom, K., Mawdsley, I., Nielsen, O.-K., Saarinen, K., Jónsson, K., & Aasestad, K. (2018). Emission factors for SLCP emissions from residential wood combustion in the Nordic countries : Improved emission inventories of Short Lived Climate Pollutants (SLCP). Copenhagen. <https://doi.org/10.6027/TN2017-570>

Program Element 5: Mandatory Curtailment Program

In order to enforce a mandatory indoor burning curtailment program, there must be a database to identify households with EPA certified devices. During a curtailment period, wood burning will be permitted only in EPA certified devices (per City of Portola Ordinance No. 354). The Enforcement Coordinator will need to reference this database in order to identify violators on mandatory curtailment days. The District's IT provider has created this database with funds from the 2015 Targeted Air Shed Grant. In order to cover any additional expenses that may come up, including revisions and maintenance, the District estimates a total of \$3,000 in funding for this grant period.

The District may need assistance with forecasting curtailment days. A partnership with Sonoma Technology, Inc. (STI) will be explored. At least \$10,000 would be needed to start up the program. If there is failure to attain, the curtailment months could expand from 4 to 8 months. In that case, to run a forecasting program with STI, the cost could reach as high as \$185,000, including all monthly fees. This total program element cost will be a maximum of \$188,000.

Program Element 6: Chimney Sweep Vouchers

Proper maintenance of the chimney prevents creosote build-up, reducing the risk of home heating fires and reducing smoke coming out of the chimney. According to the National Fire Protection Association, wet wood is the #1 cause of creosote build-up. Annual chimney sweeping and inspection by a reputable chimney sweep is recommended. The cost of a chimney sweep visit can vary from \$125-\$300, depending on the time of year the maintenance is done, the size of the home, the type of wood burning device, etc. Due to the low average household income in the nonattainment area, annual chimney maintenance is often neglected or performed by the homeowner only when an issue arises, such as a clogged chimney cap. Grant funding will allow the District to provide a one-time chimney sweep voucher to be used only with District-approved chimney sweep providers. This is a continuation of the Chimney Sweep Voucher program in the 2015 and 2018 Targeted Air Shed Grants.

After one year of participation in the Wood Stove Change-out Program, the District will combine a follow-up educational visit with a one-time free chimney sweep. The Burnwise Coordinator will provide the follow up educational visit with a re-introduction on proper use of the EPA certified wood heating device and will troubleshoot any issues the resident has been having. The Burnwise Coordinator will also distribute a chimney sweep voucher, with an estimated value of up to \$250. Chimney sweeps offer a valuable education component. By inspecting the chimney, burning practices can be diagnosed and issues can be addressed with the participant.

Funding for this program element totals \$150,000 (600 vouchers at \$250 per voucher). This includes a voucher after one winter of use for 89 wood and pellet stoves installed through this 2020 Targeted Air Shed Grant. It also allows for additional chimney sweep services for participants of the 2015 Targeted Air Shed Grant Greater Portola Change-out Program who have been at least 3 years without a chimney sweep maintenance.

Program Element 7: Heat Weatherization Conservation Activities

Proper weatherization of homes in the nonattainment area would significantly reduce the use of wood fuel for heating in residences that participate in the Wood Stove Change-out Program. The Plumas County Community Development Commission (PCCDC) provides weatherization services based on income eligibility and funding availability ("Opportunities for Reducing Wood Smoke in the Portola, California Area" by Jennifer Weiss, April 30, 2015). An allocation of funding through this grant will expand the weatherization services that PCCDC is able to provide. At the time of application, District staff will determine if

weatherization services are required to make the installation of an EPA certified heating device successful. The District estimates providing weatherization for 30 homes over the 5 year period at a cost of \$8,000 per home. Total funding requested for this program element is \$240,000.

Program Element 8: Marketing/Public Outreach Campaign

With limited resources and expertise, the District has been challenged to reach all residents with messaging that is impactful and behavior changing. With grant funds, potential marketing agencies will be evaluated and procured for 3 years. Community based social marketing will be considered as it has been shown to effectively change behavior. Besides reaching residents in the nonattainment area to apply for the change-out program, outreach would include best burning practices and targeted outreach to the local medical community. Data presented at the 2020 EPA Residential Woodsmoke Workshop indicates the importance of information delivered from a trusted source, such as a primary doctor or pulmonologist. However, data shows that 83% of those surveyed are never informed by a doctor of air quality impacts on personal health (Gillian Gawne-Mittelstaedt, Tribal Healthy Homes Network, March 2019). A successful marketing campaign is expected to cost \$100,000.

Program Element 9: Educational Campaign

Other Targeted Air Shed Grant recipients have had success reaching students with educational programs and using these students to carry important air quality messaging back to families. Implementing an educational outreach component is expected to reduce emissions from residential wood smoke (one grantee estimated 6% reduction in emissions through the implementation of an extensive education outreach program). This 3 year campaign would involve all three primary education schools in Portola. Partnerships with Feather River College and University of Nevada, Reno, will be investigated for collaborating on curriculum and training local educators, as well as facilitating in-class programs on air quality and health impacts. Local medical professionals may also partner in this endeavor.

Part of a successful primary curriculum is the use of handheld, low-cost sensors. Other grantees have successfully used Wynd portable sensors. Total cost for 100 sensors is \$10,000. This would allow three classrooms to use them at any given time. A successful education campaign is expected to cost \$150,000.

Program Element 10: Home Safety Campaign

According to the National Fire Protection Association (NFPA), home heating equipment is a leading cause of house fires in the U.S. An average of 52,000 fires per year result in almost 500 civilian deaths and \$1B in property damage. The local fire department, Eastern Plumas Rural Fire Protection District, is interested in partnering with the District to install smoke alarms and CO detectors in homes within the nonattainment area. The fire chief, captain and other staff are considered expert voices within the community. This visit to homes is an additional educational opportunity from another voice in the community. In addition to installing smoke alarms and CO detectors, the fire department will educate residents in the dangers of burning wet wood, which leads to creosote buildup and potentially flue fires. Dampening down overnight also decreases the temperature in the flue, leading to excess creosote. Changing these behaviors will decrease smoke emitting from the chimney, as well as keeping the home fire safe. Funds would be expended over a 5 year period for this project to improve safety in 400 units. Each home may receive up to 3 10-year smoke alarms and one CO detector (this is the protocol used by the American Red Cross for the "Sound the Alarm" campaign). Total funds required for this program element is \$70,000.

Program Element 11: Green Waste Collection Program

The District regulates open burning through a combination of the California Health & Safety Code, [Section 41800](#) et seq, [Title 17](#) of the California Code of Regulations, [Regulation III](#) of the Northern Sierra Air Quality Management District and various local ordinances. The City of Portola passed Ordinance No. 354 in 2019 banning all residential open burning within City limits. There are 900 households in the City of Portola (<https://data.census.gov/cedsci/all?q=Portola%20city.%20California%20Families%20and%20Living%20Arrangements&tid=ACSDP5Y2018.DP02>). The overwhelming majority of households have a need to remove green waste (yard waste) from their properties for defensible space to protect property from fire danger. In order for the open burn ban to be effective, reducing emissions from open burning, households need financial incentives. Funds from the 2018 Targeted Air Shed grant of just over \$50,000 will be used to pay for the first year of curbside green waste pick up by the local waste management company, Intermountain Disposal, Inc. (IMD) monthly from April through October. Providing an alternative to the open burning of yard waste for residents in the nonattainment area is crucial since the District committed to adopting an open burning rule prohibiting open burning during the months of the strongest inversions and during peak residential wood heating (State Implementation Plan).

In addition to curbside collection, the District will work with the Portola FireWise Committee and the City of Portola to establish a program for collecting large items, like branches and tree trunks, and large amounts of yard waste. Containers (20 foot), with locking lids, will be placed in several neighborhoods where residents will be able to dispose of large yard waste free of charge in both the spring and fall in order to accomplish the goal of the FireWise Committee to provide a buffer around Portola and individual homes within the City to be fire safe. The District will work with the City of Portola and IMD to transport green waste to a shredding facility and/or a biomass facility. Establishing and operating a green waste collection program within the City over five years is estimated to cost \$40,000. This is based on the assumption that at least 11 bins will be collected twice a year at 11 various sites around Portola at a cost of \$360 per bin.

The City of Portola is surrounded by the Plumas National Forest and Plumas County has constantly dealt with the issue of disposing of green waste. For the last few years, a biomass boiler has operated in proximity to the nonattainment area. The District was able to negotiate transport of green waste from the nonattainment area at no charge, as long as an entity was able to provide transport to the facility. That facility is now shut down. Residents of the non-attainment area must pay a fee to deposit green waste at a transfer station or a community collection site. The green waste is then either transported by IMD to a biomass facility (which is quite a distance to transport since the local option is no longer available) or transported out of state in the solid waste stream. Because of the fee, residents are prone to illegally burn green waste or illegally dump in the surrounding forest. The District will investigate a partnership with IMD to accept green waste at no fee or a reduced fee. This will greatly decrease emissions from illegal open burning within the City of Portola as well as legal open burning in the rest of the nonattainment area. Grant money may be used for processing equipment and transportation costs. The estimated total cost to provide this program element is \$239,600.

Program Element 12: Enforcement Coordinator (0.5 FTE)

In 2019, the City of Portola adopted Ordinance No. 354 Chapter 15.10 – Woodstove and Fireplace Ordinance. This ordinance prohibits the burning of wood burning heaters, wood burning fireplaces, wood-fired fire pits and wood-fired cookstoves during stagnant conditions. EPA certified wood heating devices are exempt from the wood burning curtailment. The District determines when curtailments are necessary, based on expected average daily PM2.5 levels of 30 micrograms/cubic meter or higher, and is tasked with

enforcing the compliance of the ordinance. The ordinance is in effect four months of the year – November, December, January and February. Since November 2017, a voluntary curtailment has been in place to inform the public of stagnant conditions through a health advisory. The curtailment program is known as “Clear the Air; Check Before You Light”. An EPA school flag program has been established in conjunction with this curtailment program with the local charter school. Expansion to the local public elementary school and junior/senior high school is expected within the next year. Residents are asked to refrain from any wood burning, if possible. However, the Ordinance (and the State Implementation Plan) requires extending the 4 months of mandatory curtailment to 8 months and requires a mandatory curtailment at 20 micrograms/cubic meter, daily average, if attainment is not achieved by the end of 2021.

The District does not currently have the resources for this type of enforcement. Grant funds will be used to extend the Enforcement Coordinator position another 3 years. This position is originally funded through the 2018 Targeted Air Shed Grant. This coordinator will utilize the certified stove database and VEE inspection techniques to determine compliance. Opacity greater than 20% emitting from a chimney, excluding 20 minutes of start-up, will be considered a violation.

The Enforcement Coordinator will enforce the City of Portola’s open burning rules, as well. This position requires a half-time employee. The hourly rate is expected to be approximately \$25/hour. At 20 hours per week, over 3 years, this program element requires \$75,000 in funding.

ii. Description of ongoing, significant reductions of PM2.5 emissions

Replacing 100 wood stoves with more efficient heating devices will greatly decrease PM2.5 emissions from indoor wood burning. These new devices are expected to last 20-30 years resulting in a decrease of at least 126 tons of PM2.5 over the lifetime of the installations. Additional PM2.5 reductions from the other program elements will further decrease emissions necessary to achieve attainment for the Plumas County PM2.5 nonattainment area. Project will also achieve innovative emission reductions by promoting new heating options, heat pumps, in the community.

iii. Analysis of PM2.5 emissions inventory in the nonattainment area

The proposal focuses on directly emitted PM2.5 from wood burning, because it is the most important source to target in order to attain the standards. Wood burning is responsible for 80 percent of the PM2.5 mass annually and 90 percent on an average exceedance day. All other sources combined contribute about 3 ug/m3 of PM2.5 annually. Cleaner burning stoves will significantly reduce emission of other pollutants including carbon monoxide, formaldehyde, sulfur dioxide and various gases such as nitrogen oxides that can irritate the lungs. Equally important will be the reduction in emissions of HAPs which include carcinogens and others that are associated with respiratory, cardiovascular, neurological, and numerous other non-cancer causing health effects.

The PMF model identified “Refuse Burning” as one of the sources contributing to PM2.5 mass. Even though the source contributes very little PM2.5 mass, it may include toxic pollutants. The most likely sources of refuse burning are non-wood items burned in wood stoves or open burning piles. Plastic, foam, and the colored ink on magazines and boxes produce harmful chemicals when burned and also damage the wood-burning appliance. The education campaign will highlight the danger of burning non-wood items to the individual and the community as a whole.

iv. Strategy for achieving greatest amount of emission reductions possible

Switching out fireplaces and uncertified wood stoves will achieve the greatest PM2.5 reductions. Repairing/replacing older (20 years or older) certified wood stoves will achieve additional emission reductions. Eliminating outdoor open burning further decreases PM2.5. Public outreach and education is critical for assisting residents to operate wood burning devices to achieve the maximum emission reductions possible.

v. Support of EPA's Strategic Plan

EPA's strategic plan has a goal to meet statutory requirements. The program elements in this proposal will assist the EPA in that these program elements assist the District in meeting SIP requirements by implementing the Portola Fine Particulate Matter Attainment Plan (Plan). The Plan includes; emission inventory of PM emission sources, an attainment demonstration, a reasonable further progress demonstration including milestones, an assessment of reasonable available control measures, motor vehicle transportation budgets and identification of contingency measures – needed if the area fails to meet the progress milestones or attainment by the attainment date. The plan is required to show linear progress towards reaching attainment by 2021. Milestone years of 2019 and 2022 have been set by the EPA and rely heavily upon a phased-in schedule to replace non-certified stoves with certified devices. Between 2021 and 2025, the District plans to change out between 100 stoves with the 2020 Targeted Air Shed Grant. It is expected that between 600-900 stoves would be changed out using previous Targeted Air Shed Grants. The District has committed to tracking, quantifying and reporting to the EPA progress towards attainment annually. The first report was submitted on July 10, 2017. Additionally, implementing these program elements will result in real emission reductions, per EPA's Strategic Plan.

c. Community Benefits, Engagement and Partnerships

The District has been and will continue to make a concentrated effort to enlist participation from all residents in the nonattainment area, making sure that low-income residents are not excluded from any funds. Not only will the owners of the older stoves benefit by upgrading to the newer stoves, all of the residents of the PM2.5 nonattainment area will benefit from significant improvements in air quality. The most current ACS online census data for 2018

(<https://data.census.gov/cedsci/all?q=Portola%20city,%20California%20Families%20and%20Living%20Arrangements&tid=ACSDP5Y2018.DP02>) shows approximately 900 households in Portola. The median household income is \$41,053 and unemployment is close to 50%. Grant funding is critical to assist this low-income community to replace old wood stoves and fireplaces, decrease PM2.5 emissions and improve public health.

Portola and much of the surrounding nonattainment area is a designated AB1550 low income community

(<https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/lowincomemapfull.htm>).

Residents who participate in the Wood Stove Change-out Program will also benefit from a public education follow-up visit by the Burnwise Coordinator and a voucher for chimney sweep services. The Spanish-speaking community will continue to be served through a translator currently working with the District (current funding is supplied through the 2015 Targeted Air Shed Grant).

The District has established partnerships with the United States Department of Agriculture (USDA), the United States Department of Energy (DOE), and the Low Income Home Energy Assistance Program (LIHEAP) to assist very low income residents with residential wood stove replacements. The District will continue to partner with the local wood stove retailers and chimney sweeps. The retailers and chimney sweeps will assist in the

outreach and marketing of the project, as well as the installation and maintenance of certified appliances and the proper removal and demolition of uncertified appliances.

The City of Portola will continue to be an active partner throughout the project. The City will continue to enforce a City ordinance as a change-of-ownership requirement that when a home is sold, all wood burning appliances must be EPA Phase II Certified, as well as any newly installed wood burning appliance. The City or Plumas County or the State will inspect new installations of wood stoves as required. The City will actively promote the change-out project during City Council Meetings and participate in community events. The District will develop a stronger partnership with the local fire department and local schools through this grant period.

Finally, the District will partner with additional groups to enhance the outreach of the project. These groups include the Hearth, Patio and Barbeque Association (HPBA), the local waste management agency, contractors, schools, local businesses, social services groups, health and medical care organizations, fire departments, home builders and remodelers, realtors/property managers, local opinion leaders, media representatives, social service groups, and others who can reach large numbers of people and may share its goal of improved air quality and public health.

All residents within the nonattainment area will benefit from a steady supply of seasoned firewood that will be supplied through the seasoned wood program. Property and individuals in the nonattainment area will be safer and emit less emissions as a result of the home safety program. All residents within the City of Portola will be eligible for one year's payment for curbside collection of yard waste and semi-annual community green waste collections, resulting in a reduction of emissions from open burning and relieving some of the financial burden imposed by the open burn ban. Residents within the City of Portola will benefit from the enforcement of the City of Portola's adopted mandatory wood burning curtailment of uncertified stoves. And all school families will benefit through the education campaign by becoming more aware of air quality and health issues.

d. Project Sustainability

The District believes that emission reductions will continue past the final year of the grant when considering each program element. Removing high emission heating devices permanently reduces emissions from these very outdated appliances. Replacing high emission heating devices with lower emitting devices that (on average) have a useful life of 20 years will ensure the continuing reductions. The District believes that the once the seasoned wood program has been established, it will continue to be maintained and utilized by the City, agency or non-profit group. The education provided by the Burnwise Coordinator and the education program will remain with the families served. Smoke alarms installed through the home safety program will last for 10 years. Wood sheds with weather-proof roofing will last a homeowner many years. Once weatherization is provided, this will decrease the need for heating in homes that have been better insulated for the lifetime of the home. Once residents have participated in the green waste curbside pickup program, it is expected they will continue to participate in the program and the emission reductions from the open burning of green waste will continue well into the future.

Additionally, the Northern Sierra Air Quality Management District has developed and written the Portola Fine Particulate Matter (PM_{2.5}) Attainment Plan (PM Plan) which requires commitments to continue efforts to reduce emissions after the EPA funding for this project has ended.

e. Environmental Results

Table 2 summarizes outputs, outcomes, and performance measures for each activity. The assumptions used in estimating emission reductions are described in details in Attachment B, Emission Reductions Calculations. Progress in air quality will be evaluated on an ongoing basis, and, after each calendar year, a thorough evaluation will be conducted using PM2.5 FRM, PM2.5 BAM, PM2.5 speciated data, and meteorological data, with a special emphasis on trends in woodburning marker data (levoglucosan, mannosan, and galactosan).

Table 2. Environmental results

Activity	Outputs	Outcomes	Performance Measures
Replace 100 wood stoves	78 woodstoves are changed out for NSPS Step 2 certified woodstoves 11 woodstoves are changed out for Step 2 pellet stoves. 11 woodstoves are changed out for non-wood heating devices.	Annual Emission Reductions: <ul style="list-style-type: none"> 6.3 tons of PM2.5 0.03 tons of SO2 0.3 tons of NOx_x 36.8 tons of CO Emission Reductions Over Device Lifetime (20 Years): <ul style="list-style-type: none"> 126.1 tons of PM2.5 0.7 tons of SO2 7.0 tons of NOx 735.7 tons of CO 	Number of devices replaced
Burnwise Coordinator/ Education and Outreach Elements 2, 8 and 9	Provide outreach and education on proper burning techniques of woodstoves	Assume 2/3 of households uses wet wood and 1/3 underloads. Reduce wet wood burning and under loading by 50%. <ul style="list-style-type: none"> 21.0 tons of PM2.5/Year 105 tons of PM2.5/5 Years 	Reduction in visible smoke upon opacity reading
Wood Shed Program	Build 100 woodsheds for residents who don't have a proper wood storage space. Average woodshed lasts 10 years.	Eliminate burning wet wood in 100 households <ul style="list-style-type: none"> 1.6 tons of PM2.5/Year 16 tons of PM2.5/10 Years 	Number of sheds built
Seasoned Wood Program	Reduce the number of residents using wet wood by 70%.	Reduce PM2.5 emissions 70%: <ul style="list-style-type: none"> 26.1 tons of PM2.5 / Year 130.76 tons of PM2.5 / 5 Years 	Amount of dry wood provided/Families served
Chimney Sweep Voucher	Sweep 600 chimneys Provide outreach and education on proper stove operation and maintenance	Reduce PM2.5 emissions 20% <ul style="list-style-type: none"> 1.9 tons of PM2.5/Year 9.3 tons of PM2.5/5 Years 	Number of chimneys swept
Heat Weatherization Conservation	Conduct in-home inspection and energy audits and weatherize 30 homes	Reduce wood use 30% <ul style="list-style-type: none"> 0.1 tons of PM2.5 / Year 2.8 tons of PM2.5 / 20 Years 	Number of homes weatherized for heat conservation
Home Safety Campaign	Install 1,200 smoke alarms and 400 CO detectors	Reduce fire and health hazard Improve burning efficiency	Number of alarms and detectors installed
Green Waste Collection	Collect yard waste from 900 households	Annual Emission Reductions: <ul style="list-style-type: none"> 0.0001 tons of PM2.5/Year Help public understand that all burning is harmful to their health 	Amount of green waste collected
Mandatory Woodburning Curtailment/ Enforcement Coordinator	Enforce woodburning curtailment and open burning Ensure that no visible smoke emitted from chimneys and no open burning is conducted	Enforce 75% compliance on curtailment days <ul style="list-style-type: none"> 1.1 tons of PM2.5 / Year 5.7 tons of PM2.5 / 5 Years 	Number of violations issued

The District fully expects to complete the expenditure of all U.S. EPA Grant funds awarded within five years of receipt. Table 3 illustrates the approximate timeline

Table 3. Approximate Project Timeline January 1, 2021 to December 31, 2025

	2021	2022	2023	2024	2025
Wood Stove Change-out Program Equipment					
Burnwise Coordinator					
Wood Shed Program					
Seasoned Wood Program					
Mandatory Curtailment Program					
Chimney Sweep Vouchers					
Heat Weatherization Conservation Activities					
Marketing/Public Outreach Campaign					
Education Campaign					
Home Safety Campaign					
Green Waste Collection Program					
Enforcement Coordinator					
Grant Reporting and Oversight					

f. Programmatic Capability and Past Performance

The District has successfully changed out approximately 400 stoves within the nonattainment area in the past 4 years with funding from the EPA 2015 Targeted Air Shed Grant, as well as implemented a voluntary wood burning curtailment program and participated in a variety of public outreach events. The District has maintained partnerships with local stove installers, chimney sweeps, the City of Portola, and various agencies to further the goal of decreasing PM_{2.5} in the nonattainment area. The District is working closely with Portola city officials, Plumas County agencies, local community organizations and state and federal government organizations to reach attainment by 2021. The 2019 annual design value of 12.2 is a substantial improvement over the 2018 design of 14.7 microgram/cubic meter. This is evidence that the measures implemented under the 2015 Targeted Air Shed Grant are beginning to show improvement in air quality. The District will use the same procedures, forms and tracking techniques used in the current Targeted Air Shed Grant for the Wood Stove Change-Out Program element. The principal and responsible parties of the District assigned to the project are:

- Executive Director, Gretchen Bennitt
- Air Pollution Specialist II, Julie Ruiz
- Deputy Executive Director, Joe Fish
- Accounting Clerk, Dawn Lunsford
- Air Pollution Specialist III, Sam Longmire
- Air Pollution Specialist I, Melissa Klundby

Julie Ruiz has been the Program Coordinator for the Portola program. Melissa Klundby has been the Burnwise Coordinator since August 2019. Gretchen Bennitt and Joe Fish have been processing invoices, developing disbursement requests and, along with Julie Ruiz, have been producing quarterly progress reports to the EPA. In addition to the Portola wood stove change out program, Sam Longmire is currently administering a woodstove change-out program for all three District counties using California Climate Investments funding. To date, 103 stoves have been changed out. In addition, the District has successfully administered \$2,224,000 of incentive funds from the ARB Lower Emission School Bus Program and \$2,281,808 from the Carl Moyer program.

ARB staff will assist with annual verification of progress including estimating reductions in emissions and PM_{2.5} concentrations. Kasia Turkiewicz, Air Resources Engineer, will oversee the project on behalf of ARB to ensure that funds are passed to the District in a

timely manner. Kasia has over 20 years of experience evaluating air quality, meteorological, and emissions data to better understand the nature and causes of elevated PM concentrations. For the past four years she has managed CARB's Woodsmoke Reduction Program funded with \$8M from the Greenhouse Gas Reduction Fund. . Eugene Kim, Air Resources Engineer, will provide technical support to track emission reductions and evaluate progress towards attainment of the PM2.5 standard. With respect to grant management, ARB has accepted several U.S. EPA grants in the past three years, including: Section 105 Air Pollution Control Financial Assistance Grant (Grant Number A-00901315), PM 2.5 Monitoring Network Grant (Grant Number PM-98960901), and the State Clean Diesel Grant (Grant Number DS-00T87901). Each of these recent grants represents a continuation of a multi-year, multi-million dollar grant from U.S. EPA. For each grant, ARB has completed all grant agreement terms and completed (or expects to complete) the approved work plans to expeditiously apply funds to shared U.S. EPA and ARB air quality goals. ARB has documented progress on these grants through submittal of required reports and inputting collected data into state and national databases, as appropriate per the grant terms.

Additionally, ARB has extensive experience implementing multi-million dollar incentives programs, such as the Lower-Emission School Bus Program, the Carl Moyer Memorial Air Quality Standards Attainment (Moyer) Program, Goods Movement Emission Reduction (Goods Movement) Program, the Air Quality Improvement Program (AQIP), and the Providing Loan Assistance for California Equipment (PLACE) Program. ARB's experience in these programs has established solid working relationships with air districts as well as engine/equipment and retrofit manufacturers and vendors necessary for successfully implementing the proposed project.

g. Budget Narrative and Voluntary Cost Share/Match and Leveraged Funds

Table 4 illustrates a proposed budget. Due to rounding, numbers in Table 4 may not add up precisely to the indicated total amount. The District will request \$40,000 from the District Board of Directors to be utilized to leverage this grant. This funding will be allocated from the annual AB2766 DMV surcharge fund for Plumas County. This can be allocated by a quorum vote of the six board of directors during a regularly scheduled air district board meeting. The District Board of Directors has approved leveraging of these funds and this amount in the past for the 2015 Targeted Air Shed Grant. These funds will be used to augment equipment costs.

Table 4. Proposed Budget for Portola PM2.5 Nonattainment Area Air Shed Project

Line Item & Itemized Cost	EPA Funding	Non-Federal Cost Share
CARB Personnel		
Project Manager @59.87/hr X 6hrs X 52 weeks X 5 Years	\$93,397	
TOTAL CARB PERSONNEL	\$93,397	\$0
CARB Fringe Benefits @34.98%		
TOTAL CARB FRINGE BENEFITS	\$32,670	\$0
CARB Travel		
Milage for PM: 300 miles/trip @ \$0.58/mi x 10 trips	\$1,740	
Conference or workshop (1 trip)	\$1,700	
TOTAL CARB TRAVEL	\$3,440	\$0
OTHER - SUBAWARD:		
Equipment (wood stove change-out program)*		
electric heat pump systems	\$71,333	
pellet	\$50,600	
propane	\$13,500	
kerosene	\$4,500	
wood	\$286,700	\$40,000
MOU with the City of Portola for stove destruction	\$9,520	
Other (moisture meters, thermometers, CO/Smoke detectors, etc.)	\$9,740	
TOTAL EQUIPMENT	\$445,893	\$40,000
Program Elements		
Burnwise Coordinator	\$150,000	
Wood Shed Program	\$60,000	
Seasoned Wood Program	\$300,000	
Mandatory Curtailment Program	\$188,000	
Chimney Sweep Vouchers	\$150,000	
Heat Weatherization Conservation Activities	\$240,000	
Marketing/Public Outreach Campaign	\$100,000	
Education Campaign	\$150,000	
Home Safety Campaign	\$70,000	
Green Waste Collection Program	\$239,600	
Enforcement Coordinator	\$75,000	
TOTAL PROGRAM ELEMENTS	\$1,722,600	\$0
District Personnel		
District Project Manager	\$111,198	
Project Coordinator	\$132,480	
Business Manager	\$47,214	
Project Staff #1	\$33,738	
Project Staff #2	\$38,803	
Fringe Benefits (27%)	\$98,127	
TOTAL DISTRICT PERSONNEL	\$461,560	\$0
District Travel and Public Outreach		
Public Outreach and Education	\$22,505	
Travel (Conference or workshop for two staff)	\$3,408	
TOTAL DISTRICT TRAVEL AND PUBLIC OUTREACH	\$25,913	\$0
TOTAL OTHER - SUBAWARD	\$2,655,966	\$40,000
CARB Indirect Charges @45.21% of (Personnel + Fringe)		
TOTAL CARB INDIRECT	\$56,995	\$0
TOTAL FUNDING (Rounded to the nearest dollar)	\$2,842,468	\$40,000
TOTAL PROJECT COST (Rounded to the nearest dollar)		
TOTAL PROJECT COST[3]		\$2,882,468

* Cost share funds include \$40,000 District funds from local fees.

Due to rounding, numbers in Table 4 may not add up precisely to the indicated total amount.